Annals of Clinical and Analytical Medicine
Original Research

Post-endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis; Evidence from 1100 ERCP cases

Post-endoscopic retrograde cholangiopancreatography and risk factors

Esat Taylan Ugurlu
Department of General Surgery, Health Science University, Sanliurfa Mehmet Akif Inan Education and Research Hospital, Şanlıurfa, Turkey

Abstract

Aim: Since post-ERCP pancreatitis (PEP) is considered the most common complication of ERCP, it has been the focus of research to explore its prevention. Identifying patients with high-risk factors for PEP is one of the most important aspects for PEP prevention. Patients with high-risk factors should be carefully evaluated and alternative treatment and diagnostic techniques may be preferred instead of ERCP.

Our aim in this study is to determine the risk factors in patients who develop pancreatitis after endoscopic retrograde cholangiopancreatography procedure and to determine an early and appropriate diagnosis and treatment approach in these patients.

Material and Method: 1100 ERCPs performed by a single operator were included in this study. Post-ERCP pancreatitis (PEP) developed in 222 patients after the procedure. ERCP indications, age, gender, clinical findings, comorbidities and imaging frequencies of the patients who developed PEP were recorded before and after the procedure.

Result: 20.1% of the patient who underwent ERCP developed PEP. It was found that comorbidity and stent placement increased the development of PEP in patients who underwent ERCP. It was found that performing ERCP with the pre-incision method reduces the rate of PEP development. It was found that ERCP indications had no effect on the development of PEP. It was found that the rate of hospitalization in the intensive care unit increased in patients who developed PEP. It was found that the rate of PEP development decreased as operator experience increased.

Discussion: The risk of PEP is multifactorial, and the effects of some risk factors can be minimized or completely eliminated. Different patient-related risk factors can help predict PEP.

Keywords
ERCP, PEP, Risk Factors

DOI: 10.4328/ACAM.21392 Received: 2022-09-15 Accepted: 2022-10-26 Published Online: 2022-11-01 Printed: 2022-11-01 Ann Clin Anal Med 2022;13(11):1293-1295
Corresponding Author: Esat Taylan Ugurlu, Department of General Surgery, Health Science University, Sanliurfa Mehmet Akif Inan Education and Research Hospital, Şanlıurfa, Turkey.
E-mail: doktoramca_1971@hotmail.com P: +90 531 905 25 77
Corresponding Author ORCID ID: https://orcid.org/0000-0001-5273-1583

Introduction

The most common complication of endoscopic retrograde cholangiopancreatography (ERCP) is pancreatitis [1-3]. New onset and progressive abdominal pain or typical symptoms of pancreatitis, at least 3-fold elevated amylase value starting after the procedure and lasting longer than 24 hours, hospital stay longer than one day were considered as post-ERCP pancreatitis (PEP) [3].

The frequency of PEP has been reported as 1-40% in various studies [3]. Predicting possible complications and their course is important to reduce risk and mortality [3]. Various risk factors have been identified for the development of complications, especially PEP [3]. The relationship between PEP and female gender, young age, previous PEP history, presence of recurrent pancreatitis attacks, sphincter of Oddi dysfunction, percutaneous biliary intervention and difficult cannulation has been proven in various studies [2, 4].

Discussions on risk factors for PEP are still ongoing. Further studies are needed to clarify the early and definitive diagnosis, risk and severity classification, as well as the treatment of pancreatitis after ERCP [3].

The aim of this study is to determine the risk factors in patients who develop PEP in ERCPs performed in our clinic and to share our experiences.

Material and Methods

In this study, 1110 ERCP data performed in Şanlıurfa Mehmet Akif Inan Training and Research Hospital General Surgery ERCP Unit between May 2019 and December 2021 were analyzed retrospectively. Ethics committee approval for the study was obtained from Harran University Clinical Research Ethics Committee (13.12.2021-22/13.00). All selected ERCP experiences were interventions by a single general surgeon. PEP developed in 222 patients after ERCP. ERCP indications, age, gender, clinical findings and comorbidities of patients who developed PEP were examined. Patients under 18 years of age were excluded from the study.

Patients who were followed up and treated with the diagnosis of pancreatitis were evaluated with clinical, laboratory and imaging methods (CECT). The revised Atlanta Classification was used for staging of severity in acute pancreatitis [5].

Statistical Analysis

Data were evaluated using the IBM SPSS Statistics 20.0 package software (IBM, New York, USA). Data were given as number of units (n), percentage (%) and mean±standard deviation. Statistical analyzes were performed using unpaired t-test and chi-square test depending on the appropriate variable. A p -value <0.05 was considered significant.

Results

Of the 1100 patients who underwent ERCP, 222 (20.1%) developed clinically and laboratory proven PEP. Comorbidity was found to increase PEP development of PEP in patients who underwent ERCP (x2=3.93; p=0.047). Stent insertion in patients who underwent ERCP was found to increase the rate of PEP development (x2=9.1; p=0.002). It was found that stent insertion in ERCP did not affect the development of PEP according to comorbidity status (x2=1.03; p=0.25). It was found that performing ERCP with the pre-incision method decreased the probability of developing PEP (x2=18.28; p<0.0001). ERCP indications were found to have no effect on the development of PEP (x2=1.07; p=0.90). Patients who developed PEP had a high rate of hospitalization in the intensive care unit (x2=17.02; p<0.0001) (Table 1). In this series, the incidence of PEP was 172 in the first 800 patients and 50 in the last 300 patients.

Table 1. Demographic and clinical characteristics of ERCP patients

		PEP (+) (n=222)	PEP – (n=878)	x2/p value
ERCP	Age	60.2±19.0	57.3±13.6	p=0.063*
	Comorbidity +	98 (8.9%)	324 (29.5%)	x2=3.93; p=0.047
	Comorbidity -	124 (9.3%)	554 (50.4%)	
	Fist Time	201 (18.3%)	820 (74.5%)	x2=2.16; p=0.14
	Second and above	21 (1.9%)	58 (5.3%)	
Gender	Men	76 (6.9%)	394 (35.8%)	x2=0.52; p=0.001
	Women	146 (13.3%)	486 (44.2%)	
Stent	With stent	35 (3.2%)	78 (7.1%)	x2=9.1; p=0.002
	Without stent	187 (17.0%)	800 (72.7%)	
	With additional disease	69 (6.3%)	312 (28.4%)	x2=1.03; p=0.25
	Without additional disease	151 (13.7%)	568 (51.6%)	
Pre-incision	Yes	3 (0.3%)	84 (7.6%)	x2=18.28; p<0.0001
	No	221 (20.1%)	792 (72.0%)	
ERCP Indication	Choleok stone	200 (18.2%)	775 (70.5%)	x2=1.07; p=0.90
	Malign blockage	10 (0.9%)	37 (3.4%)	
	SOD	5 (0.5%)	29 (2.6%)	
	Stenosis	5 (0.5%)	22 (2.0%)	
	Liver cyst rupture	2 (0.2%)	15 (1.4%)	
Intensive care	Yes	19 (1.7%)	23 (2.1%)	x2=17.02; p<0.0001
	No	203 (18.5%)	855 (77.7%)	

* unpaired t test; SOD: Sphincter of Oddi dysfunction

Of the 1110 patients in whom we performed ERCP, 422 had additional disease [(Hypertension (n=147), diabetes mellitus (n=121), coronary artery disease (n=40), Congestive heart failure (n=24), Hyperlipidemia (n=11), Cerebro Vascular Disease (n=13), Hypothyroidism (n=8), Chronic renal failure (n=9), Hydatid Cyst (n=4), GIS Malignancy (n=2), Inflammatory Bowel Disease (n=2) and Others (n=41)]. PEP developed in 98 patients with additional disease.

Discussion

In this study, it was found that gender, comorbidity, stenting and pre-incision increased PEP in patients who underwent ERCP (Table 1). In addition, it was found that patients who developed PEP had a higher need for intensive care compared to those who did not. The important aspect of this study is that all 1100 ERCP procedures were performed by a single general surgeon. In this way, personal differences were eliminated. It was observed that the PEP development rate decreased as the operator's experience increased.

PEP is the most common complication in the ERCP procedure and may be risky in patients with high risk factors [6]. The pathophysiology of PEP is still controversial. It has a multifactorial pathophysiology. However, evaluation of patient-

related risk factors, pharmacological measures, and technical procedures applied to the patient may contribute to the prevention of PEP [7]. Identifying patients with high risk factors for PEP is one of the most important aspects for the prevention of PEP [7]. Patients with high risk factors should be carefully evaluated and alternative treatment and diagnostic techniques may be preferred instead of ERCP [7].

Most of the studies in the literature have shown that young age, female gender, absence of chronic pancreatitis, suspected Sphincter of Oddi dysfunction (SOD), recurrent pancreatitis and previous PEP history play a very important role in creating a high risk for PEP [3, 7, 8]. The most common limit accepted in studies investigating the relationship between age and PEP occurrence is 60 years, and 70 years is ranked2nd in the literature [3, 9, 10]. In this study, the mean age of the patients who developed PEP was found to be 60.2±19.0 years. In a retrospective cohort study by Katsinelos et al. involving a total of 2,715 patients, it was revealed that the history of acute pancreatitis was the only important risk factor, and the role of age and gender in the development of the disease was denied [11]. Based on 7 prospective, multicenter studies, SOD, female gender, younger age, and previous history of pancreatitis are risk factors for PEP [3].

The incidence of PEP has been reported to be 2.1-24.4% due to heterogeneous patient populations, different levels of endoscopic expertise, and procedure differences. In this study, the frequency of PEP was found to be 20.1%. This rate is in line with previously reported studies. Operator experience is also important in PEP. The lack of appropriate training or experience of endoscopists has also been associated with the development of PEP. A multicenter study (1191 patients) by Lee et al. showed that less experienced endoscopists (<200 ERCPs) are an independent risk factor for PEP [12]. In this study, it was observed that the rate of PEP development in patient series decreased as experience increased. It is thought that this finding should be taken into account in ERCP applications.

Prophylactic pancreatic stent placement has been reported to be effective in preventing PEP [13]. Our findings support these studies. In this study, it was found that the rate of PEP decreased significantly in patients with stent placement.

In this study, it was found that PEP development was less in patients who underwent the Pre-incision method. Pancreatic stent placement and endoscopic nasobiliary drainage from procedural techniques have been reported to be beneficial in the prevention of PEP [7]. These results underline the importance of appropriate interventional method.

It has been reported that the method to be preferred in patients with high risk factors according to the ERCP indication is effective in preventing PEP [14, 15]. Therefore, identifying patient-related risk factors is one of the most important aspects of prevention from PEP. However, in our study, it was found that there was no significant difference between the ERCP indication and the development of PEP.

The limitation of this study is that comorbidity rates were not determined in patients who did not develop PEP.

Conclusion

Early diagnosis and severity stratification of pancreatitis after ERCP greatly influence the outcome of the patient. Discussions on risk factors for PEP are still ongoing. Further studies are needed to clarify the early and definitive diagnosis, risk and severity classification, as well as the management of pancreatitis after ERCP.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Funding: *None*

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

References

1. Belfrage H, Lankinen E, Kylanpaa L, Louhimo J. Acute pancreatitis in Helsinki in 2016-2018: incidence, etiology and risk factors - analysis of 1378 acute pancreatitis episodes in a Finnish normal population. Scand J Gastroenterol. 2022; 1-6.

2. Ergin E, Oruc N, Ersoz G, Tekesin O, Ozutemiz O. Prognosis and risk factors of ERCP pancreatitis in elderly. Sci Rep. 2021; 11(1):15930.

3. Tryliskyy Y, Bryce GJ. Post-ERCP pancreatitis: Pathophysiology, early identification and risk stratification. Adv Clin Exp Med. 2018; 27(1):149-54.

4. Nawaz MH, Sarwar S, Nadeem MA. Post-ERCP Pancreatitis: Risk factors and role of NSAIDs in primary prophylaxis. Pak J Med Sci. 2020; 36(3):426-31.

5. Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, et al. Classification of acute pancreatitis--2012: revision of the Atlanta classification and definitions by international consensus. Gut. 2013; 62(1):102-11.

6. Mine T, Morizane T, Kawaguchi Y, Akashi R, Hanada K, Ito T, et al. Clinical practice guideline for post-ERCP pancreatitis. J Gastroenterol. 2017; 52(9):1013-22.

7. Pekgoz M. Post-endoscopic retrograde cholangiopancreatography pancreatitis: A systematic review for prevention and treatment. World J Gastroenterol. 2019; 25(29):4019-42.

8. Kohli K, Samant H, Khan K, Pandit S, Morgan K, Cvek U, et al. Risk Stratification in Post-ERCP Pancreatitis: How Do Procedures, Patient Characteristics and Clinical Indicators Influence Outcomes? Pathophysiology. 2021; 28(1):76-85.

9. Fujita K, Yazumi S, Matsumoto H, Asada M, Nebiki H, Matsumoto K, et al. Multicenter prospective cohort study of adverse events associated with biliary endoscopic retrograde cholangiopancreatography: Incidence of adverse events and preventive measures for post-endoscopic retrograde cholangiopancreatography pancreatitis. Dig Endosc. 2022; 34(6):1198-204.

10. Meng QQ, Zhao SB, Wang ZJ, Shen Z, Xia T, Wang SL, et al. Incidence and risk factors for post-ERCP pancreatitis in pancreas divisum patients without chronic pancreatitis. Scand J Gastroenterol. 2020; 55(6):732-6.

11. Katsinelos P, Lazaraki G, Gkagkalis S, Chatzimavroudis G, Fasoulas K, Zavos C, et al. Predictive factors for post-ERCP pancreatitis: a large-scale single expertized endoscopist study. Surg Laparosc Endosc Percutan Tech. 2014; 24(6):512-16.

12. Lee HJ, Cho CM, Heo J, Min Kyu Jung 3, Tae Nyeun Kim 4, Kook Hyun Kim, et al. Impact of Hospital Volume and the Experience of Endoscopist on Adverse Events Related to Endoscopic Retrograde Cholangiopancreatography: A Prospective Observational Study. Gut Liver. 2020;14(2):257-64.

13. Fujisawa T, Kagawa K, Ochiai K, Hisatomi K, Kubota K, Sato H, et al. Prophylactic Efficacy of 3- or 5-cm Pancreatic Stents for Preventing Post-ERCP Pancreatitis: A Prospective, Randomized Trial. J Clin Gastroenterol. 2016; 50(3):e30-4.

14. Koseoglu H, Solakoglu T, Basaran M, Özer Sarı S, Tahtacı M, Yaman S, et al. Risk factors for post-ERCP pancreatitis: it depends on the ERCP indication. Acta Gastroenterol Belg. 2020; 83(4):598-602.

15. Saito H, Kadono Y, Shono T, Kamikawa K, Urata A, Nasu J, et al. Increased post-endoscopic retrograde cholangiopancreatography pancreatitis for choledocholithiasis without acute cholangitis. J Gastroenterol Hepatol 2022; 37(2):327-34.

How to cite this article:

Esat Taylan Ugurlu. *Post-endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis; Evidence from 1100 ercp cases. Ann Clin Anal Med 2022;13(11):1293-1295*